

FERNALD SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL STRATEGY CRITICAL ANALYSIS TEAM REPORT

December, 1997

Introduction

The Critical Analysis Team reviewed Fernald's proposed Silos 1 and 2 Accelerated Waste Retrieval Strategy. The Team supports the strategy which appears to be a sound step toward treatment and disposal of Silos 1 and 2 waste.

The scope of the Team's review was narrow because details supporting the strategy are not yet available for review (see attached Team Objective). The Team did not evaluate FDF's cost or schedule estimates for the project. In short, the Team was asked whether the accelerated retrieval strategy was desirable in the context of the OU4 project, what improvements to the strategy could be made, and what further external reviews might be needed as the strategy proceeds.

The Team has arranged this report into three primary parts: (1) the pros and cons of the strategy, (2) Team concerns with the strategy and necessary steps to ensure success, and (3) critical points at which further technical review is recommended.

Pros of the Accelerated Waste Retrieval Strategy

The Team believes the strategy could...

...significantly reduce the risk of radon release as a result of a catastrophic silo failure. The uncertainty of a silo collapse incident, combined with the severe consequences of such an accident, make early removal of the waste from the silos an important step in assuring safety.

...reduce personnel and environmental exposure to radon. Currently, the radon emissions are increasing due to drying and cracking of the bentonite in the silos. Removal of the waste from the silos and storage in a facility designed to mitigate radon will reduce this exposure.

...show clear measurable cleanup progress at Fernald. Given the setbacks OU4 has experienced over the last two years, accelerated waste retrieval would demonstrate that Fernald is making positive strides toward its most vexing cleanup challenge. In addition, the Team assumes that measurable cleanup progress would increase stakeholder confidence and worker morale.

...develop and demonstrate DOE and FDF management and contracting capabilities. The accelerated strategy provides a relatively straight forward project for DOE and FDF to demonstrate they can effectively prepare fixed-price scopes of work, issue fixed-price contracts, and manage those contracts to successful completion.

...be the first significant step in treatment and disposal of the waste. Waste retrieval capability is a critical step in ensuring that Fernald treats the silo wastes. Last year's Independent Review Team recommended that FDF give more focus to waste retrieval. This

accelerated approach provides such focus.

...demonstrate waste retrievability. Not only will this project demonstrate the ability to remove waste from the silos, it will also demonstrate the ability to transfer waste to a treatment facility, thereby greatly reducing technical uncertainty associated with waste handling. This data can then be utilized in final design of the treatment facility, potentially averting technical problems.

...be economical. Given the scope of the entire OU4 project, accelerated waste retrieval is not a significant cost. This effort affords the project many programmatic advantages. The accelerated strategy has the potential to reduce overall OU4 costs. Although these savings and benefits are difficult to quantify (e.g. avoidance of treatment facility downtime, avoidance of delays, etc.); the Team feels that the potential for programmatic benefits probably outweighs the additional cost of the tanks.

...provide treatment plant flexible feed capability. The proposed tank farm facility should provide the flexibility to match the rate at which waste is processed in the treatment facility with little difficulty. This is critical given the existing multiple unknowns in both retrieval and treatment.

...provide for quicker, easier sampling and better characterization of the waste. The tanks can be designed to provide for easier sampling taking, ultimately resulting in a greater knowledge of silo waste contents. This information will provide better insight into the appropriate treatment of the waste, as well as reduce uncertainty in contracting for such treatment.

...make waste staging logistically and technically easier. Currently, the unknown and uncertain qualities of the waste could result in technical problems, contractual disputes and claims. Were the waste thoroughly mixed, characterized, and reliable transfers assured, the chance of contract disputes due to unforeseen factors would be greatly reduced.

...separate waste retrieval from waste treatment. This provides operating flexibility and reduces the risk of schedule and technical problems.

...provide an opportunity to deal with bentonite uncertainties. The presence of bentonite in the silos will pose technical concerns in retrieval, transport and treatment. Accelerated retrieval allows the retrieval issues to be addressed early enough to avoid programmatic delays.

...allow accelerated D&D of the silo area. Accelerated waste retrieval will allow Fernald to D&D the silos, provide an opportunity for disposing of the silos earlier (currently FDF plans this disposal for the on-site disposal cell), and characterize soil and groundwater beneath the silos to allow remediation.

...relieve site construction congestion. If accelerated waste retrieval is not pursued, the retrieval superstructure and the Silos 1 and 2 treatment facility will be constructed at the same time. This will result in site congestion and more difficult construction management, likely reducing productivity and increasing the risk of injury to construction personnel.

Cons of the Accelerated Waste Retrieval Strategy

The accelerated waste retrieval strategy could...

...foster the public perception that, once the waste is safely stored, DOE will take no further actions toward waste treatment and disposal. This is a valid concern. DOE has a history of "temporary" and "interim" actions which by default become long term "solutions." To effectively respond to this concern, DOE, FDF and the regulators must remain focused on the *entire* OU4 remediation. Accelerated retrieval is only the first step in treating and disposing of the silo waste and must always be viewed as such. This full programmatic perspective is essential to ensuring that integration issues are resolved and that inaction is not the result of safer storage.

...increase the cost of the silos project. While the FDF estimated cost increase to install the tanks is minimal over the life of the program, increased near term expenditures will be required. FDF should attempt to identify the potential programmatic improvements resulting from accelerated waste retrieval.

...increase Decontamination and Decommissioning commitments. The accelerated strategy will require D&D of a number of additional tanks. To reduce the cost of these additional efforts, the tanks should be designed to facilitate D&D activities (e.g. design without crevices and accumulation points, decontamination nozzles, etc.).

...increase waste handling. The storage facility provides an interim step between the silos and the treatment facility. As a result, the waste will be transferred twice in the accelerated strategy, as opposed to once in the baseline case. The more the waste is handled, the greater the chance of health and safety impacts, as well as increased operating and maintenance costs. An aggressive ALARA program including sound planning, training, and mock-up activities will be essential to addressing this issue.

...increase risks from construction. Although the accelerated retrieval allows the reduction of radon risks, the additional work associated with construction of new tanks will result in the normal construction risks for workers. These risks should be minimized through an adequate Environment Safety and Health program.

Concerns with the Accelerated Waste Retrieval Strategy

The Team's concerns surrounding the project focus primarily around management and contracting issues. The Team's opinion is that technically, the accelerated retrieval strategy is relatively straightforward but will pose significant management challenges for both DOE and FDF.

- DOE, FDF and the regulators must remain focused on the *entire* OU4 remediation. Accelerated retrieval is only the first step in treating and disposing the silos waste. This full programmatic perspective is essential to ensuring that integration issues are resolved and that inaction is not the result of safer storage. Retrieval must always be discussed in the context of ultimately immobilizing and disposing the waste. Presentation of the accelerated retrieval strategy within the context of a life-cycle schedule would help demonstrate DOE and FDF commitment to the ultimate treatment and disposal of silos waste.

- Upper FDF management must support this project in order for it to be a success. This includes a clearly defined mission statement to which upper management is committed.

- DOE must commit to providing and maintaining sufficient budget to ensure adequate project management, technical support and administrative support.

- The Team is concerned about FDF's ability to manage a fixed-price contract under current labor agreements because of the convoluted and indirect management structure. Existing labor agreements and contracts have the potential to severely impact the project. DOE and FDF should conduct a review of the contracting strategy for construction and operation of both the retrieval and the treatment system. The review should focus on the consistency of the contracting approach. Additionally, the Team feels FDF may have difficulty managing simultaneous contracts for Silo 3 construction and Silos 1 and 2 retrieval.

- The Request For Proposal/Statement Of Work must be sufficiently definitive to allow a fixed-price bid.

- The Request For Proposal must effectively limit bid responses to demonstrated technologies. To be acceptable a technology must have successfully operated on an industrial scale. This is important to ensure that resources are not wasted considering unproven technologies. The RFP must clearly communicate that this is *not* a research and development program.

- FDF's current staff capabilities (e.g. experienced process engineering, experienced subcontracting administration, project configuration management, and experienced field engineering) are not adequate to perform design and construction of the retrieval facility "in-house." The Team feels a fixed-price contract should be used for the retrieval system, taking full advantage of the data FDF has developed in support of the project. While this data should not inappropriately bias the bid process, it is important in limiting bid responses to demonstrated technologies and reducing the contingency that contractors build into their bids.

- A variety of other management issues must be resolved before DOE and FDF are ready to execute this project. The following management systems and capabilities must be in place:

- Management of a design review process to ensure efficient, effective and documented comment screening, response, and resolution.

- Processes for management of project changes.

- Configuration management.

- Contract language to assure a mechanism for prompt problem identification and resolution, claims control and dispute resolution.

- Contract language that clearly defines the methodology for progress reporting and defined deliverables for progress payments.

- Request For Proposals language and bid evaluation guidelines to ensure that radiation and industrial safety receives a high priority.

- Processes for acceptance inspection and testing of the completed retrieval system.

- Processes for Operational Readiness Review and startup.

- All reviews must add value to the project, and redundancy should be minimized. DOE and FDF should establish a clear, goal based review plan. A baseline schedule which includes review cycles should be developed as soon as possible. All reviewing parties must agree and commit to the substance and schedule of the review plan. The following aspects of each review must be clearly defined: who is reviewing, why they are reviewing, and the

objectives of their review. All review comments and responses must be in writing and resolved.

- A significant portion of contractor progress payments should be dependent on the waste retrieval demonstration (Silo 4) and actual retrieval from Silos 1 and 2.
- Key project team members, including DOE and FDF staff, should visit sites that have had successful projects and failures in the recent past (approximately ten years). The objective of the visits would be to observe and understand why some projects succeed, why others fail, and what would be done differently were the project pursued again. This should provide FDF with a better understanding of failures, allowing FDF to implement actions to avoid similar failure.

Critical Points for External Review

In general, the Team's recommendations for further external reviews are intended to obtain two goals: (1) FDF awarding a sound contract to a credible contractor; and (2) FDF having the management systems in place to ensure project success. Based on these general goals, the Team feels the following critical points require external review (in chronological order):

1. The Project Management Plan, the Project Execution Plan, Project Procedures, and the ability to conduct effective field follow-through. This review will look at the comprehensiveness and effectiveness of these management documents/systems.
2. The Statement Of Work, Request For Proposals, and all attached technical requirements for comprehensiveness and sufficient definition to allow for fixed-price bids.
3. Preliminary design for acceptability. This review should take place when Process & Instrumentation Diagrams, general layout, process equipment datasheets, etc., are available.
4. Final design for safety, operability, compliance with baseline, constructability, Reliability Availability and Maintainability (RAM) with baseline.
5. The dry-run for Operational Readiness Review.

In addition, if there are outstanding issues identified during the bid response and evaluation period, FDF should consider the limited use of external experts.

Lastly, additional reviews should be conducted as needed to ensure that waste retrieval activities integrate well with the rest of OU4. While the scope of this review is narrow, the Team does not want to lose the focus on the importance of the success of the entire OU4 program.

Summary


The Team sees many positive aspects in the acceleration strategy and few negative impacts. While the concern of DOE not taking further action after the waste is safely stored is valid, the potential for reducing radon exposure, reducing the risk of a catastrophic accident, showing cleanup progress, and supporting the immobilization of silos waste make accelerated retrieval an attractive option. DOE, FDF and the regulators must keep the focus on the *entire* OU4 remediation. Accelerated retrieval is only the first step in treating and disposing the silos waste and must always be discussed in the context of ultimately

immobilizing and disposing the waste.

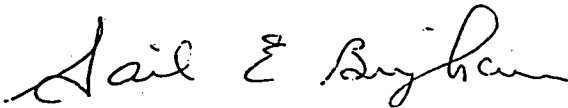
While accelerated retrieval seems a prudent approach, it will not succeed without appropriate management and contracting systems. The acceleration project provides DOE and FDF the opportunity to demonstrate the ability to manage a project to successful completion.



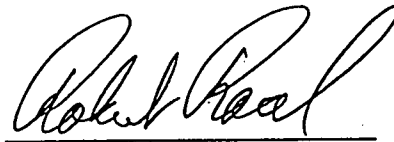
Todd Martin
Team Leader



Eric T. Newberry, Jr.



Gail E. Bingham



Robert Roal